

4.5. Streams

4.5.1. Introduction

The following section includes a description of stream resources from the January 2006 EA (Jones & Stokes 2006), as well as additional resource information, impact analysis, and identification of mitigation measures for the proposed Urban Connector Alignment.

Several public comments on the 2006 EA were received regarding the characterization and evaluation of potential impacts on streams and fish (Appendix 3, categories 20.0, 20.1). The comments primarily concerned the proposed action's effects on fish and fish habitat in Bigelow Gulch, and they questioned the level of analyses conducted. Additional information not included in the January 2006 EA is provided below regarding the drainage systems involved as well as a more detailed impact analysis. This discussion clarifies the relationship of streams, provides additional information on other stream channels identified, and describes the hydrology, fish presence, and potential fish habitat that may be affected by the proposed action.

4.5.2. What stream resources are present in the project area?

The proposed action is located in Water Resource Inventory Areas (WRIA) 55 (Little Spokane River) and 57 (Middle Spokane River). Ecology has designated 62 WRIsAs throughout the state. These areas are designated for purposes of developing watershed plans to manage water resources and protect existing water rights under the Watershed Planning Act (RCW 90.82) passed by the Washington State Legislature in 1998. Beginning in 1999, Spokane County initiated an assessment of water resources in WRIsAs 55 and 57. The effort has included the following documentation:

- Little Spokane (WRIA 55) and Middle Spokane (WRIA 57) Watershed Planning, Phase II – Level 1 Assessment (Golder Associates 2003a) – This report is a characterization of the watersheds including geologic setting, land use, groundwater and surface water quality and quantity, and a framework for watershed modeling for the Middle Spokane and Little Spokane River watersheds.
- Level 2 Technical Assessment: Watershed Simulation Report (Golder Associates 2004) – The main goal of the modeling was to support decision-making during development of the watershed plan. The model provides information on the water budget for the basin, simulates surface water - aquifer

interactions, and provides a “what if” tool for evaluation of effects and alternatives.

- Little Spokane River Basin (WRIA 55) Instream Flow Needs Assessment (Golder Associates 2003b) and Instream Flow and Fish Habitat Assessment (Northwest Hydraulic Consultants and Hardin-Dais 2004) – Instream flow studies were conducted for the Little Spokane and Spokane Rivers to determine flow needs for fish and other factors.
- Watershed Management Plan, WRIA 55 – Little Spokane River and Water Resource Inventory Area 57 – Middle Spokane River (Spokane County 2006c) – The watershed management plan for WRIsAs 55 and 57 addressed water supply and use in the watershed and strategies for future use, instream flows for fish and out-of-stream water for future uses, and characterization of water quality based on a synthesis of data and monitoring for Total Maximum Daily Load implementation.

Numerous other water quality and quantity studies have been conducted in the Spokane River watersheds and for the SVRP. Those reports can be found at the following major sources:

- Ecology: WRIA 55 Information: <http://www.ecy.wa.gov/biblio/wria55.html> and WRIA 57: <http://www.ecy.wa.gov/biblio/wria57.html>
- U.S. Geological Service: SVRP Information: <http://wa.water.usgs.gov/projects/svrp/publications.htm>
- Spokane County Water Resources Program: <http://www.spokanecounty.org/wqmp/>

Water Quality

Water quality is regulated by the Washington State Surface Water Quality Standards (Chapter 173-201A WAC). Water bodies that do not meet State Surface Water Quality Standards must be reported to the EPA every 4 years, in accordance with Section 303(d) of the Federal Clean Water Act. The Spokane River and the Little Spokane River have been designated as Class A - excellent streams with characteristic uses including water supply (domestic, industrial, agricultural); stock watering; fish and shellfish; wildlife habitat; recreation; and commerce and navigation (Golder Associates 2003a).

Section 303(d) List

Section 303 (d) Impaired and Threatened waterways are listed when two criteria are met:

- Water quality does not meet state water quality standards; and
- Technology-based controls are not sufficient to achieve water quality standards.

No 303(d) listed waterways occur within the project area; however the 303(d) list (last updated in 2004) includes the following waterbodies in WRIAs 55 and 57 (Ecology 2007b):

- Middle Spokane River – Total tissue polychlorinated biphenyls; and
- Little Spokane River – Total issue polychlorinated biphenyls and turbidity.

4.5.3. Subbasins and Streams

The January 2006 EA identified eight streams within the project area. Based on review of DNR mapping and field verification, 11 streams have been identified within four drainage subbasins (Figure 4.3-1).

Bigelow Gulch Subbasin

Bigelow Gulch Creek is located on the westernmost portion of the proposed Urban Connector Alignment. It includes four streams (numbered 1 and 1a through 3) that are hydraulically connected and are part of what has been defined as the Bigelow Gulch subbasin drainage basin, an area of approximately 2,700 acres (Figure 4.3-1). This portion of the project area is part of the Little Spokane River watershed and WRIA 55 (Spokane County 2006c), which drains into the 500-year floodplain shown in Figure 4.3-1 and which is discussed in Section 4.3, *Floodplains*.

During a 15-year period from 1960 to 1975, USGS collected random peak flow measurements on Bigelow Gulch Creek at a gaging station near Palmer Road (USGS gage 12430370) (USGS 2007). Records indicate peak annual flows ranged from a low of 4.0 cubic feet per second (March 1967) to a high of 222 cubic feet per second (February 1963). Before the USGS measurements, a historic peak flow estimated at 1,510 cubic feet per second occurred on June 11, 1950. This event was also mentioned in public comments to the January 2006 EA as causing damage to bridges and homes (Appendix 3).

Bigelow Gulch Creek (Stream 1) has perennial flow that originates as springs and seeps in the Orchard Prairie area. The creek parallels East Bigelow Gulch Road, crosses under the roadway south of the Palmer Road intersection, and continues in a realigned channel through farmland before dissipating into wetlands and the “B Zone” 500-year floodplain that lies to the north of East Bigelow Gulch Road and northeast of Havana Street (Lawlor pers. comm.). Based on SCC Section 11.16-030, Stream 1 is a type 4 stream, and its tributaries (Streams 1a, 2, and 3) are type 5 streams. Several privately owned ponds receive water from the Bigelow Gulch springs and associated tributaries. Fish have been observed in the Bigelow Gulch mainstem by local residents, and it is believed that the ponds were once stocked with rainbow or brook trout. For the purposes of this analysis, the assumption is made that fish occur in the mainstem of Bigelow Gulch, and that fish protection and relocation

procedures and fish habitat mitigation will be incorporated into the road construction plans.

Argonne Road Subbasin

The Argonne Road subbasin is located just west of the Bigelow Gulch Road/North Argonne Road intersection. Stream 4 is the only stream located in this subbasin that lies within the project area (Figure 4.3-1). This subbasin encompasses approximately 5,300 acres from Pleasant Prairie Road on the north to the Spokane River on the south and southwest. The subbasin drains south toward the Spokane River; however, according to the Little Spokane River/Middle Spokane River watershed management plan, there are no permanent stream tributaries to the Spokane River and the porous soil of the Spokane Valley/Rathdrum Valley aquifer absorbs flow from streams before it reaching the river (Spokane County 2006c).

Based on field observations made by Spokane County Public Works, drainage from this stream dissipates into the ground where an earthen berm has been constructed across the drainage on private land approximately 1 mile downstream of Bigelow Gulch Road (Hemmings pers. comm.). This berm prevents surface water in Stream 4 from discharging directly to the Spokane River. Based on SCC Section 11.16-030, stream 4 has been categorized as a type 5 waterway.

Pleasant Prairie/Forker Subbasins

The Pleasant Prairie and Forker subbasins encompass approximately 4,900 acres, an area south of Pleasant Prairie Road to Sullivan Road in the City of Spokane Valley. As previously mentioned, there is no permanent streams tributary to the Spokane River (Spokane County 2006c).

The Pleasant Prairie subbasin is located east of Pleasant Prairie Road and contains seasonal streams 5, 6, and 7 (Figure 4.3-1). This drainage is composed of many small tributaries that carry seasonal runoff with only occasional connection to the Spokane River (Williams pers. comm.). This seasonal headwater is designated as a type 5 waterway.

The Forker subbasin, the easternmost drainage, is located in the Forker Road area and contains Streams 8, 9, and 10. Stream 8 does not connect to the Spokane River, and dissipates into the ground in the floodplain south of the intersection of Forker and Progress roads (Figure 4.3-1). Stream 8 is seasonal in its upper reaches and perennial in its lower reaches; however, fish are not known to occur in the Forker Road drainages (Lawlor pers. comm.). Based on SCC Section 11.16-030, Stream 8 is classified as a type 4 stream.

Streams 9 and 10 are tributary to Stream 8. Based on SCC Section 11.16-030, Stream 9 is a type 4 stream and Stream 10 is classified as a type 5 stream.

4.5.4. What regulations apply to streams?

Regulations and guidelines pertaining to surface water quality and quantity apply at the federal, state, county, and municipal level. These regulations and guidelines are considered when reviewing potential effects to surface water quality and quantity in the study area.

Section 4.2.3 (Groundwater Regulations) identified federal, state, and county regulations applying to groundwater quality and quantity. Many of those regulations also apply to surface water and will not be repeated here; however additional regulations applying to surface water and streams are discussed.

Federal

Federal Endangered Species Act - Bull trout occur in the Spokane River and Little Spokane River; however, no suitable habitat occurs in project area streams and none of the streams in the project area permanently connect to the habitat supporting endangered species. The distance of the project area from the nearest streams that support Endangered Species Act (ESA)-listed species and critical habitat (greater than 3 miles) would prevent indirect effects related to water quality and hydrology. Therefore, the project would have no effect on ESA-listed fish species or designated critical habitat.

State of Washington

Hydraulic Code Rules (WAC 220-110) - Under the State of Washington's Hydraulic Code Rules, actions that affect the bed, banks, or waters of surface water bodies in Washington require a hydraulic project approval (HPA) from the Washington State Department of Fish and Wildlife (WDFW). Elements of the proposed action that would require an HPA include culvert installations, culvert lengthening, and stream channel relocation. Typically, HPA permits include provisions such as project timing, conservation measures, and mitigation requirements.

Spokane County

Spokane County Critical Areas Ordinance - SCC Section 11.16-030 defines streams and specifies buffer widths for the different stream classifications. These stream types are shown in Table 4.5-1. Clearing and construction within riparian buffers will require mitigation in the form of riparian habitat creation or enhancement.

Table 4.5-1. Spokane County and Washington State Department of Natural Resources Stream Classifications and Buffer Widths

SCC 11.16-30	Riparian Buffer (feet)	Interim State DNR Stream Type ¹
Type 1, shorelines of Statewide Significance	250	Type S
Type 2, perennial stream with channel >20 feet wide	100	Type F
Type 3, perennial stream with channel >10 feet wide	100	Type F
Type 4, stream with channel <10 feet, effects-quality of type 1, 2, or 3	75	Type Np
Type 5, stream not classified as 1, 2, 3 or 4	25 ²	Type Ns

DNR = Washington State Department of Natural Resources

¹ Interim State DNR stream type is based on the Interim Stream Type conversion table in WAC 222-16-031.

² Source: Spokane County Code Section 11.16-030

SCC 11.16-030 refers to the state stream typing system (WAC 222-16-030). However, the classification system in WAC 222-16-030 has recently been revised, so the Spokane County classification system is no longer directly comparable to state stream classes. The exception is County type 1 streams, which are equivalent to State type S; and County type 5 streams, which are equivalent to State type N streams.

Table 4.5-2 presents the stream types within the project area and stream buffer requirements as defined in SCC Chapter 11.20 – Critical Areas and WAC 222-16. The width of existing buffer varies where the existing roadway parallels the streams. For example, the existing buffer width adjacent to Bigelow Gulch Creek ranges from approximately 5 to 50 feet, depending on location.

Table 4.5-2. Stream Types and Critical Area Buffers¹

Subbasin Name and Stream #	Stream Types ²	Buffer Width (feet)
Bigelow Gulch - 1	Type 3	100
Bigelow Gulch – 1a, 2	Type 5	25
Bigelow Gulch - 3	Type 5	25
Argonne – 4	Type 5	0 ³
Pleasant Prairie – 5, 6, 7	Type 5	25
Forker – 8 (upper 3,100 lf)	Type 5	25
Forker – 8 (lower 2,200 lf)	Type 4	75
Forker –9	Type 5	25
Forker –10	Type 5	25

¹ No buffering required for type 5 streams when there is no connection to type 1,2,3, or 4 streams (Ord. 11.20). ² Stream types based on field observations. ³ Source: SCC Section 11.16-030. lf = linear feet.

Vegetation buffers along streams protect water quality, channel stability, and habitat that support fish and other aquatic species, and provide a variety of benefits to wildlife.

4.5.5. How were potential effects evaluated?

The analysis of impacts involved the compilation and review of background information including reconnaissance surveys, WDFW Priority Habitat information (WDFW 2006), county and state geographic information systems data, aerial photos, communications with WDFW, and accounts from commenters. Stream typing, as defined in SCC Chapter 11.20, (types 1 through 5), was used to determine the riparian buffer zone requirements and stream protection requirements.

Potential effects of the proposed action on streams and water quality were assessed using methods described in the WSDOT *Environmental Procedures Manual* (2006a). WSDOT Method 1 from the Environmental Procedures Manual (WSDOT 2006a) was used to estimate runoff and pollutant loading from the project.

Of importance was the analysis of potential impact of the proposed action that would lead to any of the following outcomes:

- taking (i.e., killing, harming, or harassing individuals, or destroying the habitat) of any fish listed as threatened or endangered under the federal ESA;
- creation of partial or complete fish passage barriers;
- reduction in a measurable quantity of viable fish habitat; or
- impacts on water quality or hydrologic conditions of streams that would result in fish kills or reduced fish productivity downstream.

4.5.6. What effects would the Urban Connector Alignment have on streams?

Proposed Action

How would construction affect streams?

The following discussion explains potential effects to streams within the project area based on the current roadway design, regulations for stormwater treatment, critical area buffers, and other state, county, and federal regulations. Hydrology, water quality, and aquatic life and habitat characteristics have may be affected by the proposed action.

Table 4.5-3 outlines construction activities and impacts that could occur in each subbasin and stream during construction.

Bigelow Subbasin

Construction of the proposed Urban Connector Alignment would require roadway crossings of Bigelow Gulch Creek (Stream 1) in two locations, at the Palmer Road intersection and at the intersection of Bigelow Gulch Road and the west end of Weile Avenue (Figure 2-1, sheets 1–5). The crossings would require removal of riparian vegetation, the replacement and extension of two existing culverts, and realignment of open channel at those locations (Table 4.5-3). In addition, approximately 3.2 acres of buffer would be impacted by the proposed action. The reduction in open stream channel and the loss of riparian habitat would diminish the overall function and habitat value of Bigelow Gulch Creek in those locations. Construction would involve installation of two 24-inch diameter culverts near the east end of Weile Avenue in Stream 1a, a seasonal swale.

Construction would also include the replacement and extension of four existing culverts, two at driveway entrances and two at crossing the existing roadway approximately 1,200 feet east of the intersection of the east end of Weile Avenue and Bigelow Gulch Road. This would result in an incremental reduction in vegetation and habitat value in those locations (Table 4.5-3).

Pleasant Prairie/Forker Subbasin

Construction of the proposed Urban Connector would require the replacement and extension of three culverts on Type 5 streams in the Pleasant Prairie subbasin (Table 4.5-3). Approximately 0.41 acre of buffer would be impacted by extension of the three culverts.

In the Forker subbasin, the proposed action would include the construction of a detention pond and culverts near the intersection of Bigelow Gulch and Forker Roads. This would result in the realignment of approximately 400 feet of seasonal stream channel adjacent to the proposed detention pond and associated culverts (Forker Creek, stream 8). In addition, approximately 1,980 linear feet of channel would be realigned downstream of the detention pond and reconstructed (Table 4.5-3). The channel would be designed following the WDFW Aquatic Habitat Guidelines for restoration (WDFW 2004). In addition, approximately 3.3 acres of buffer would be impacted by the project. The reduction in open stream channel and the loss of riparian habitat would diminish the overall function and habitat value of Forker Creek (stream 8). Stream habitat conditions are expected to incrementally improve over time with stabilization of the streambed, regrowth of vegetation, and renewal of stream hydrologic functions.

Table 4.5-3. Drainages within the Project Area and Potential Construction Impacts

Subbasin Name and Stream #	Perennial/Seasonal	Construction Activities	Impacts
Bigelow Gulch – 1	Perennial	<ul style="list-style-type: none"> ▪ Reconstructing 600 lf of channel ▪ Replacing/extending 6 culverts totaling 1,034 lf ▪ Constructing detention pond adjacent to channel ▪ Removing riparian vegetation ▪ Rerouting flow 	<ul style="list-style-type: none"> ▪ Converting 630 lf of channel to culverts ▪ Impact to 3.32 acre of buffer ▪ Temporary reduced function and habitat value for approximately 0.60 acre of riparian habitat ▪ Altering in-channel dimension/area and local hydrology ▪ Temporarily increasing turbidity ▪ Diminishing vegetation filtering and shading functions
Bigelow Gulch – 1a	Seasonal	<ul style="list-style-type: none"> ▪ Constructing detention pond adjacent to channel ▪ Replacing/extending 2 culverts totaling 230 lf 	<ul style="list-style-type: none"> ▪ Altering in-channel dimension/area and local hydrology ▪ Impact to 0.13 acre of buffer ▪ Temporarily increasing turbidity
Bigelow Gulch – 2	Seasonal	<ul style="list-style-type: none"> ▪ Constructing 1 culvert totaling 160 lf ▪ Removing vegetation 	<ul style="list-style-type: none"> ▪ Minor impact since no defined stream channel or surface flow at this location ▪ No impacts on buffer since no channel ▪ Temporarily increasing turbidity
Bigelow Gulch – 3	Seasonal	Not affected	No impacts
Argonne – 4	Seasonal	Not affected	No impacts
Pleasant Prairie – 5, 6, 7	Seasonal	<ul style="list-style-type: none"> ▪ Replacing/extending 3 culverts totaling 590 lf ▪ Removing vegetation 	<ul style="list-style-type: none"> ▪ Converting 230 lf of channel to culverts ▪ Impact to 0.41 acre of buffer ▪ Altering in-channel dimension/area and local hydrology ▪ Temporarily increasing turbidity ▪ Diminishing vegetation filtering and shading functions
Forker – 8	Seasonal (upper 3,100 lf) Perennial (lower 2,200 lf)	<ul style="list-style-type: none"> ▪ Reconstructing 1,980 lf of channel ▪ Constructing detention pond and associated culvert ▪ Removing vegetation ▪ Rerouting flow 	<ul style="list-style-type: none"> ▪ Converting 400 lf of channel to culvert/detention pond ▪ Impact to 3.32 acre of buffer ▪ Altering in-channel dimension/area and local hydrology ▪ Temporarily increasing turbidity ▪ Diminishing vegetation filtering and shading functions

Subbasin Name and Stream #	Perennial/Seasonal	Construction Activities	Impacts
Forker – 9	Seasonal	<ul style="list-style-type: none"> ▪ Installing 1 culvert 290 lf in length ▪ Constructing 230 lf of channel ▪ Constructing detention pond adjacent to channel ▪ Removing riparian vegetation ▪ Rerouting flow 	<ul style="list-style-type: none"> ▪ Converting 290 lf of channel to culvert ▪ Impact to 0.50 acre of buffer ▪ Temporary reduced function and habitat value in 0.2 acre ▪ Altering in-channel dimension/area and local hydrology ▪ Temporarily increasing turbidity ▪ Diminishing vegetation filtering and shading functions
Forker – 10	Seasonal	<ul style="list-style-type: none"> ▪ Constructing 1 culvert 160 lf in length ▪ Constructing detention Pond adjacent to channel ▪ Removing vegetation 	<ul style="list-style-type: none"> ▪ Converting 160 lf of channel to culvert ▪ No impact to buffer ▪ Altering in-channel dimension/area and local hydrology ▪ Temporarily increasing turbidity ▪ Diminishing vegetation filtering and shading functions

lf = linear feet

Source: Spokane County autoCAD files

Streams 9 and 10 (type 5 streams) would be crossed by the proposed roadway alignment. Impacts would include the installation of two culverts totaling 450 feet in length and the realignment and reconstruction of approximately 230 linear feet of open channel in stream 9. Approximately 0.50 acre of buffer would be impacted by extension of the two culverts. Reconstruction of the channel would be designed following the WDFW Aquatic Habitat Guidelines for restoration (WDFW 2004).

Critical Areas/Riparian Habitat

As mentioned in Table 4.5-3 and in the previous section, construction of the roadway would impact stream buffers of varying widths and locations along the alignment. Regulations regarding riparian buffers are defined in Section 11.20.060 Fish and Wildlife Conservation Areas in the SCC. Based on the proposed alignment and project “footprint” and estimated 3.4 acres of buffer would be impacted along Bigelow Gulch Creek drainage (streams 1 and 1a), and 4.1 acres in the Pleasant Prairie/Forker streams (streams 5 through 10).

Impacts on the buffers would include the loss of riparian vegetation and functional value (wildlife habitat, diversity) varying in value based on such factors as vegetative cover, soils, proximity to existing roads, and land uses. This would result in the loss of scattered forested and open grass areas adjacent to the existing roadway. These areas can support wetland-associated animal species and protect the wetlands and their associated plant and animal species from disturbance. However, the disturbance limiting capacity of these buffer areas is limited by their proximity to the current road and to the proposed Urban Connector Alignment. Some portions of the existing roadway within wetland buffers would be removed and restored to native vegetation, ultimately improving buffer functions in those areas.

Mitigation for the impacts would be defined in a management plan prepared in compliance with Section 11.20.060c Performance Standards for Regulated Uses and Activities of SCC.

Hydrologic Processes

As project elements are under construction, drainage patterns would be temporarily disrupted while new drainage facilities are constructed and while new facilities are temporarily rerouted prior to final connections. As previously mentioned, stream reaches would be realigned and temporarily diverted. (Table 4.5-3) Stream reaches will be designed following the WDFW Aquatic Habitat Guidelines for Restoration (WDFW 2004), which includes design considerations for hydrologic processes as part of the overall stream restoration design.

Project construction is not anticipated to make appreciable differences in peak flow, base flow, or flood timing within the project area.

Water Quality

Short-term increases in turbidity may occur in flowing streams during construction. The downstream extent of increased turbidity in any flowing water would be localized and not extend to other receiving waters such as the Spokane River since none of the streams discharge to the river. Because work would occur during the dry season, ephemeral and seasonal streams would only be affected during rain events following soil disturbance. Construction general BMPs and erosion control measures will minimize impacts during times of flow.

Minor impacts on water quality could occur where stream channels are realigned and immediately following culvert installation.

How would operation of the project affect streams in the project area?

Hydrologic Processes

Construction of the Urban Connector Alignment would modify existing surface drainage patterns, quantities of runoff, and constituents in the runoff. Roadside ditches and detention ponds would be built as part of the project to capture, convey, and treat runoff prior to discharge to the streams. Impervious surface area on the proposed Urban Connector would increase from 33.9 acres (current) to 90.7 acres (future). This additional impervious surface area would result in an overall increase in the percent of impervious area within the four subbasins of the project area. The project is not located in any subbasins identified as stormwater problem areas in the Spokane County comprehensive plan (Spokane County 2001b, as amended).

Current and estimated changes to impervious surface area resulting from the project for each drainage are presented in Table 4.5-4.

Increased impervious surface area can alter the hydrology of a drainage basin, including increased peak runoff, reduced low flow conditions, and faster stream response to precipitation events.

Stormwater from the project will be managed through local infiltration BMPs. Stormwater will be discharged to streams only after detention. The project is not expected to have measurable hydrologic effects on the Bigelow Gulch and Forker subbasins.

Table 4.5-4. Impervious Surface Area

Subbasin Name and Number(s) (unofficial)	Stream Numbers	Total Drainage Area (acres)	Current Impervious Area of Existing Roadway (acres)	Impervious Area Increase with the Proposed Project (acres)	Post Project Impervious Area (acres)
Bigelow Gulch, 1	1 Mainstem, 1a, 2, and 3	2,708	11.4	18.0	29.4
Argonne, 2	4	5,258	7.6	8.5	16.0
Pleasant Prairie, 3	5, 6, and 7		5.5	12.2	17.7
Forker, 4	8, 9, and 10	4,916 ¹	9.4	18.2	27.6
Totals	1 through 10	12,882	33.9	56.9	90.7

¹ Stormwater is managed separately in Basins 3 and 4; however, these are subsets of a larger drainage. Therefore, the total areas for these basins combined are shown here.

Source: Spokane County autoCAD files

Water Quality

Roads collect a variety of pollutants that can include oil and grease, polynuclear aromatic hydrocarbons, lead, zinc, copper, cadmium, sediments, road salts and other de-icers, and can impact water quality in streams (Ecology 2004). Unless effects are mitigated with approved stormwater treatment and detention, highways and other development producing these contaminants can impair the beneficial uses of the receiving waters (both ground and surface waters) (Ecology 2004). The potential effect to groundwater was discussed in Section 4.2 of the January 2006 EA and in Section 4.2, *Groundwater*, of this Revised EA.

As previously indicated, WSDOT Method 1 (WSDOT Data – FHWA method) was used to estimate pollutant loads from the proposed action. The calculations are based on highway runoff data collected in western Washington since 2003. The data provide a recent and accurate estimate of pollutant concentrations for both untreated and treated highway surfaces. The data are representative of runoff from highways with a wide range of ADT volumes. These data represent a “worst case” analysis since ADT for the proposed action (19,000 vehicles is at the lower end range of ADT volume highways (2,400 – 180,000) from which the runoff data were collected (WSDOT 2006a).

Table 4.5-5 presents the estimated No Action and proposed action annual pollutant loads to the Bigelow Gulch Creek Subbasin and to the Forker Creek Subbasin. As prescribed in the WSDOT data-FHWA methodology, the loading calculations are for those portions of the proposed roadway where runoff would enter streams (i.e., Bigelow Gulch Creek and Forker Creek), and does not include the portion of the roadway where runoff would enter roadside swales and infiltrate into the ground

(roadway section from east end of Weile Avenue to the Bigelow Gulch Road/Forker Road intersection).

Table 4.5-5. Annual Pollutant Loading for No Action and Proposed Action¹

Bigelow Gulch Subbasin	No Action	Proposed Action
Roadway treated (acres)	2.25	11.54
Roadway untreated (acres)	9.29	0
Total roadway (acres) ²	11.54	11.54
Annual load of TSS (lbs./year)	7,795	669
Annual load of total phosphorous (lbs./year)	11.8	3.5
Annual load of total copper (lbs./year)	2.0	0.6
Annual load of dissolved copper (lbs./year)	0.57	0.35
Annual load of total zinc (lbs./year)	10.8	2.9
Annual load of dissolved zinc (lbs./year)	3.7	2.0
Forker Subbasin	No Action	Proposed Action
Roadway treated (acres)	0	18.17
Roadway untreated (acres)	25.17	7.7
Total roadway (acres) ²	25.17	25.17
Annual load of TSS (lbs./year)	20,765	7,407
Annual load of total phosphorous (lbs./year)	30.2	14.7
Annual load of total copper (lbs./year)	5.0	2.4
Annual load of dissolved copper (lbs./year)	1.26	0.94
Annual load of total zinc (lbs./year)	27.7	13.0
Annual load of dissolved zinc (lbs./year)	8.8	5.8

¹ Based on WSDOT Data - FHWA Method (Method 1) of the WSDOT *Environmental Procedures Manual* (2006a). ² An additional 53.99 acres of impervious roadway in the Bigelow Gulch, Argonne and Pleasant Prairie Subbasins are not included in the analysis since runoff in those portions of the roadway would discharge to roadside swales and infiltrate and not discharge to streams

Under the proposed action, annual pollutant loading to the two streams would decrease from current conditions for all parameters (Table 4.5-5).

The proposed alignment occurs within the Aquifer Sensitive Area; therefore, stormwater runoff treatment facilities will be installed to treat the first 0.5 inch of stormwater from a precipitation event throughout the corridor (Spokane County 1998b).

What are the indirect effects on streams?

Indirect effects are those caused by the proposed action that are later in time or farther removed in distance, but still reasonably foreseeable.

Because the Urban Connector Alignment will manage water quality with a combination of BMPs and stormwater treatment facilities to avoid or minimize direct effects, it is anticipated that there will not be any downstream effects outside the study area. Stormwater from the project will infiltrate into the ground and enter drainages that eventually discharge to floodplains and then infiltrate into the ground.

The proposed Urban Connector Alignment could result in development that would increase or change the quality of stormwater discharges to streams. It is possible that more pollutants would be discharged to streams as a result of the proposed action. As required by SCC, all development would be subject to the regulations set forth in CAO Chapter 11.20 and the requirements associated with permits such as Section 10 approval from the U.S. Army Corps of Engineers. Assuming that all requirements for such use would be fulfilled, the indirect impacts would not be considered significant.

What measures are proposed to minimize effects on streams?

Environmental Commitments

The proposed action will adhere to the following environmental commitments to avoid or minimize impacts on water quality, quantity, and habitat conditions in project area streams:

- Spokane County will implement a TESC plan to minimize construction impacts on stream water quality. BMPs such as the following would be included in the design:
 - Installing temporary sediment ponds;
 - Installing sediment traps;
 - Installing silt fences;
 - Creating filter berms and other stormwater filtration devices; and
 - Cleaning streets, dust watering, and establishing stabilized construction access points.
- Spokane County will prepare and implement an SPCC following (WSDOT specification 1-07.15(1) for road, bridge, and municipal construction (WSDOT 2006c).
- Spokane County will comply with conditions of the HPA issued by WDFW and comply with the conditions of the NPDES general permit for construction issued by Ecology.

- Stormwater treatment systems will be installed that meet the requirements of the *Spokane County Guidelines for Stormwater Management* (Spokane County 2005 draft or 1998b, as amended) and *Stormwater Management Manual for Eastern Washington* (Ecology 2004).

Mitigation

Compensatory mitigation will be implemented to address impacts on riparian buffers per SCC Section 11.20.060:

- Spokane County will prepare a management plan in consultation with the Spokane County Soil Conservation District and WDFW to address mitigation for impacts on buffers. Mitigation will include the variety of measures designated in Section 11.20.60(2) Riparian Habitat Performance Standards, such as enhancement of the riparian buffer using native plants and fencing. The plan will include numbers and species of plants, a planting schedule, and a maintenance agreement to ensure long-term survival.
- Reconstruction of the stream channels will follow *Aquatic Habitat Guidelines: An Integrated Approach to Marine, Freshwater, and Riparian Habitat Protection and Restoration* (WDFW 2004) and *Fish Passage Design at Road Culverts Guidelines* (WDFW 2003) if fish are found in the portions of creeks impacted by the proposed action.

Analysis of project effects on streams in the project vicinity indicates that none would rise to a level of significance. In reaching this conclusion, environmental commitments and mitigation measures listed in Section 4.5.3 of the Bigelow Gulch Road EA dated January 2006 were considered, as well as measures included in the present document.

No Action

How will construction affect streams?

Under No Action, the Urban Connector Alignment would not be constructed, and no other activities are proposed. Consequently, there would be no impacts on streams.

How will operation affect streams?

Under No Action, operation of the existing roadway would result in the continued contribution of roadway pollutants and road sand into streams from untreated runoff. The annual pollutant loading would increase over time and would be greater than the projected pollutant load of the proposed action with water quality treatment (Table 4.5-5). This increase in pollutant loading would result in the continued incremental reduction in stream quality over time.